Ministry of
Northern Development
and Mines

Ontario

ONTARIO GEOLOGICAL SURVEY

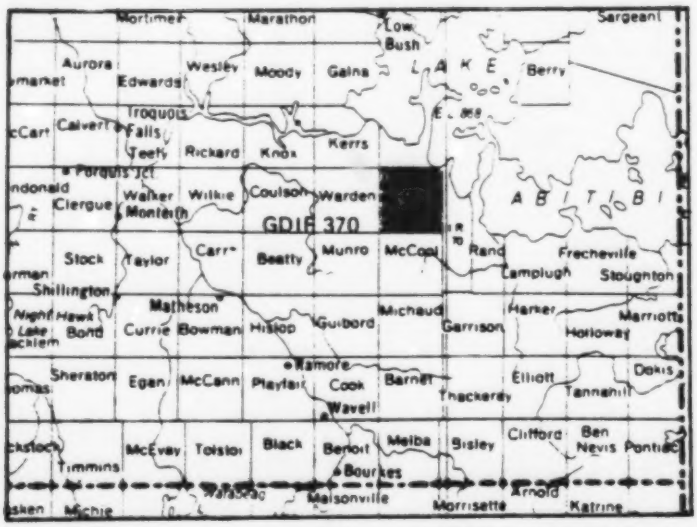
GEOLOGICAL DATA INVENTORY FOLIO

GDIF 370

MILLIGAN TOWNSHIP

DISTRICT OF COCHRANE

Compiled by the Staff of
the Residents Geologist's Office
Kirkland Lake



LOCATION MAP Scale: 1:1 013 760 or 1 inch to 16 miles

NTS Number 42A/09

Mining Claim Map Number

This project is part of Operation Black River-Matheson (BRIM) which was funded equally by the Ontario Ministry of Northern Development and Mines and the Ontario Ministry of Natural Resources.

STATEMENT This inventory is unedited. Discrepancies may occur for which the Ontario Geological Survey does not assume liability. Information from this source may be quoted if credit is given. Reference to this inventory should be made as follows:

Ontario Geological Survey
1987: Milligan Township, District of Cochrane: Ontario Geological Survey, Geological Data Inventory Folio 370, compiled by the staff of the Resident Geologist's Office, Kirkland Lake, 27p, and 2 maps.

Original Compilation by: K.D. Kalicharran, D. Mimeault, P.E. Savarie, and F.M. Boucher: November 27, 1986.

Date	Page Revised	Revised by

Date	Page Revised	Revised by

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ACCOMPANYING MAPS

Property Location Map 1

Exploration Data Map 1

Map Scale 1: 31 680 or 1 inch to ½ mile

CONVERSION FACTORS FOR MEASUREMENTS IN ONTARIO GEOLOGICAL SURVEY PUBLICATIONS

If the reader wishes to convert imperial units to SI (metric) units or SI units to imperial units the following multipliers should be used:

CONVERSION FROM SI TO IMPERIAL			CONVERSION FROM IMPERIAL TO SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709 7	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm^3	0.061 02	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.308 0	cubic yards	1 cubic yard	0.764 555	m^3
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 96	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 75	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 62	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 908 8**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

1 ounce (troy)/ton (short)	20.0	pennyweights/ton (short)
1 pennyweight/ton (short)	0.05	ounce (troy)/ton (short)

One gram(g) per tonne is equivalent to one part per million (1 ppm).

NOTE–Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries published by The Mining Association of Canada in co-operation with the Coal Association of Canada.

DATA SOURCES CHECK LIST

NOTE: The following sources have been searched to compile the data for this area. If no reference data was found the appropriate box is marked 'no'; if reference data was found, the box is marked 'yes'.

All reference data found are included in the following pages. If the box is blank, the data source has not yet been searched. If the box is marked N.A., the source item is Not Applicable to this area and therefore not searched.

	SOURCES OF DATA	Data	Initial
1	Resident Geologist's Office Files	YES	K.D.K.
2	Assessment Files Research Office, Toronto	YES	K.D.K.
3	ODM General Index; 9 volumes	YES	K.D.K.
4	Catalogue of Airborne Geophysical Surveys (ODM)	NO	K.D.K.
5	ODM Mineral Resources Circulars and OGS Mineral Deposits Circulars	NO	K.D.K.
6	ODM Industrial Mineral Reports	NO	K.D.K.
7	Bibliography of Post Precambrian Theses - Karrow (ODM MP 1)	NO	K.D.K.
8	Bibliography of Precambrian Theses - Ginn (ODM MP 2)	NO	K.D.K.
9	Newspaper Clippings File	YES	K.D.K.
10	GSC Index to Publications	NO	K.D.K.
11	OGS Index to Published Maps and Reports - MP 77 and Supplements to MP 77	YES	K.D.K.
12	OGS Index Maps	YES	K.D.K.
13	Source Mineral Deposit Records (O.G.S.)	YES	K.D.K.
14	Author - Subject Articles File	YES	K.D.K.
15	Miscellaneous Papers: ODM & OGS	YES	K.D.K.
16	ODM Geological Circulars: OGS Study Series	YES	K.D.K.
17	ODM Preliminary Reports: ODM Bulletins	YES	K.D.K.
18	ODM – OGS Open File Reports	YES	K.D.K.
19	OGS Northern Ontario Engineering Geology Terrain Studies	YES	K.D.K.
20	OGS Aggregate Resources Inventory Papers	NO	K.D.K.
21	OGS Mineral Potential Maps	NO	K.D.K.

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METALS AND MINERALS REFERENCES LIST

- △ anh . . . . . Anhydrite
- △ ank . . . . . Ankerite
- △ anna . . . . . Annabergite
- △ ap . . . . . Apatite
- △ arg . . . . . Argentite
- △ As . . . . . Arsenic
- △ asp . . . . . Arsenopyrite
- △ asb . . . . . Asbestos
- △ ba . . . . . Barite
- △ be . . . . . Beryl
- △ Bi . . . . . Bismuth
- △ bn . . . . . Bornite
- △ bran . . . . . Brannerite
- △ bruc . . . . . Brucite
- △ Cd . . . . . Cadmium
- ▲ calc . . . . . Calcite
- △ carb . . . . . Carbonate
- △ cel . . . . . Celestite
- △ cc . . . . . Chalcocite
- △ cp . . . . . Chalcopyrite
- △ ch . . . . . Chert
- △ clay . . . . . Clay
- △ Co . . . . . Cobalt
- △ cob . . . . . Cobaltite
- △ cb . . . . . Columbite
- △ Cu . . . . . Copper
- △ cor . . . . . Corundum
- △ dol . . . . . Dolomite
- △ ep . . . . . Epidote
- △ ery . . . . . Erythrite
- △ fel . . . . . Feldspar
- △ fl . . . . . Fluorite (fluorspar)
- △ fu . . . . . Fuchsite
- △ gn . . . . . Galena
- △ gt . . . . . Garnet
- △ goe . . . . . Goethite
- ■ Au . . . . . Gold
- ▲ gf . . . . . Graphite
- △ gl . . . . . Gravel
- △ gyp . . . . . Gypsum
- ▲ hem . . . . . Hematite
- △ il . . . . . Ilmenite
- △ Fe . . . . . Iron
- △ IF . . . . . Iron Formation
- △ jas . . . . . Jasper
- △ kaol . . . . . Kaolinite (kaolin)
- △ ky . . . . . Kyanite
- △ Pb . . . . . Lead
- △ lim . . . . . Limonite
- △ Li . . . . . Lithium
- △ mgst . . . . . Magnesite
- △ mag . . . . . Magnetite
- △ mc . . . . . Malachite
- △ Mn . . . . . Manganese
- △ mb . . . . . Marble
- △ mar . . . . . Marcasite
- △ ma . . . . . Marl
- △ mi . . . . . Mica
- △ ml . . . . . Millerite
- △ mo . . . . . Molybdenite
- △ Mo . . . . . Molybdenum
- △ mon . . . . . Monazite
- △ ne . . . . . Nephelite (nepheline)
- △ nc . . . . . Niccolite
- △ Ni . . . . . Nickel
- △ Nb . . . . . Niobium
- △ Pd . . . . . Palladium
- △ peat . . . . . Peat
- △ pent . . . . . Pentlandite
- △ Pt . . . . . Platinum
- ▲ py . . . . . Pyrite
- △ pyl . . . . . Pyrochlore
- △ pyrl . . . . . Pyrolusite
- ▲ po . . . . . Pyrrhotite
- △ q . . . . . Quartz
- ▲ qcv . . . . . Quartz carbonate vein
- △ ra . . . . . Radioactive minerals
- △ RE . . . . . Rare Earths
- △ sd . . . . . Sand
- △ sgl . . . . . Sand and gravel
- △ ss . . . . . Sandstone
- △ scap . . . . . Scapolite
- △ shee . . . . . Scheelite
- △ serp . . . . . Serpentine
- △ sh . . . . . Shale
- △ sid . . . . . Siderite
- △ si . . . . . Silica
- △ Ag . . . . . Silver
- △ sl . . . . . Slate
- △ sm . . . . . Smaltite
- △ sod . . . . . Sodalite
- △ spec . . . . . Specularite
- △ sp . . . . . Sphalerite
- △ spd . . . . . Spodumene
- △ staur . . . . . Staurolite
- △ stib . . . . . Stibnite
- △ st . . . . . Stone
- △ talc . . . . . Talc
- △ Te . . . . . Tellurium
- △ td . . . . . Tetrahedrite
- △ th . . . . . Thorite
- △ Th . . . . . Thorium
- △ thuc . . . . . Thucholite
- △ ti . . . . . Titanite
- △ Ti . . . . . Titanium
- △ tour . . . . . Tourmaline
- △ trap . . . . . Trap rock
- △ W . . . . . Tungsten
- △ uran . . . . . Uraninite
- △ U . . . . . Uranium
- △ verm . . . . . Vermiculite
- △ Y . . . . . Yttrium
- △ Zn . . . . . Zinc
- △ zr . . . . . Zircon

Solid triangles indicate metal and mineral occurrences shown on the accompanying maps, or mentioned either in the Drillhole Summary or Mineral Occurrences.

MINERAL OCCURRENCES

Map Ref. Letter	Name(s)	Mineralization	Source Mineral Deposit Record	References in OGS Mineral Deposits Circulars & OGS Industrial Mineral Reports	Additional References and/or Remarks
A	Kennco Exploration (Canada) Ltd.	Au	-	Kirkland Lake, Resident Geologist Assessment files	DDH #M-13, "Breccia cemented by calcite and pyrite in green andesite tuff".
B	Yellow Sands Prospecting Syndicate	Au	-	Kirkland Lake, Resident Geologist, Assessment files	"In a small area at the east end of L 72N, numerous instrument responses were obtained as well as assays ranging from 0.002 to 0.035oz Au/ton"
C	Kennco Exploration (Canada)	Au	-	Kirkland Lake Resident Geologist Assessment Files	A gravel sample was processed through a rocker. More than one flake of Au was counted.
D	" "	Au	-	" "	A gravel sample was processed through a rocker. More than one flake of Au was counted.
E	Bay Resources et Services "Crossley, J.D. Claims"	Au	-	Kirkland Lake Resident Geologist Assessment Files	+ 10 grains of Au/cubic foot of sand.
F	Kennco Exploration (Canada)	Au	-	Kirkland Lake Resident Geologist Assessment files	Gravel sample processed through rocker had more than one flake of Au.

GDIF FORM NO. 1

MINERAL OCCURRENCES

Map Ref. Letter	Name(s)	Mineralization	Source Mineral Deposit Record	References in OGS Mineral Deposits Circulars & OGS Industrial Mineral Reports	Additional References and/or Remarks
G	Bay Resources et Services "Crossley, J.D. Claims"	Au	–	Kirkland Lake Resident Geologist Assessment files	+ 10 grains of Au/cubic foot of sand.
I	" "	Au	–	" "	" " "
J	" "	Au	–	" "	" " "
K	Denison Mines Ltd.	Au	–	" "	Quartz boulder from field spectrometric analysis.
L	" "	Au	–	" "	" "

GDIF FORM NO.

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TYPE OF WORK		Numbers below represent the year in which the work was done; e.g., 68 for 1968.																		
EXPLORATION DATA filed at the RESIDENT GEOLOGIST'S OFFICE KIRKLAND LAKE		GEOLOGICAL	GEOCHEMICAL	TRENCHING, STRIPPING	DRILLING	ASSAY DATA	UNDERGROUND WORK	PROSPECTUS, NOTES, CORRESPONDENCE	AIRBORNE MAGNETOMETER	AIRBORNE ELECTROMAGNETIC	AIRBORNE RADIOMETRIC	GROUND MAGNETOMETER	GROUND ELECTROMAGNETIC	GROUND RADIOMETRIC	INDUCED POLARIZATON	SELF POTENTIAL	RESISTIVITY			
COMPANY/AUTHOR (file number)																				
1	Amax Minerals "Warden 2"	79																		
2	Bay Ressources et Services Inc. "Crossley, J.D.; Geisler, C.M. Claims"		85									86								
3	Denison Mines Ltd.	77	76									77	77							
4	Flagro Mines Ltd.											52								
5	Kennco Explorations (Canada) Ltd.	54 65	65		65				65	65			64		64		64			
6	Kerr Addison Mines Ltd. "Abitibi Project"								85	85							85			
7	Roford Mines Ltd.							53												
8	Ryan, W.J. (Yellow Sands Prospecting Syndicate)			85 86	85															
9	Union Carbide Exploration Ltd.								64	64										

GDIF FORM NO.

5

TYPE OF WORK		Numbers below represent the year in which the work was done;e.g., 68 for 1968.																	
EXPLORATION DATA filed at the RESIDENT GEOLOGIST'S OFFICE KIRKLAND LAKE		GEOLOGICAL	GEOCHEMICAL	TRENCHING, STRIPPING	DRILLING	ASSAY DATA	UNDERGROUND WORK	PROSPECTUS, NOTES, CORRESPONDENCE	AIRBORNE MAGNETOMETER	AIRBORNE ELECTROMAGNETIC	AIRBORNE RADIOMETRIC	GROUND MAGNETOMETER	GROUND ELECTROMAGNETIC	GROUND RADIOMETRIC	INDUCED POLARIZATON	SELF POTENTIAL	RESISTIVITY	LUMINSECENT	GOLDSPEAR	
COMPANY/AUTHOR (file number)																			
10	Utex Gold "Grubstake 84"		85															85	
11	Wright, H.H. Synd.	64	64						64	64									
12	Yellow Sands Prospecting Syndicate											84							85

GDIF FORM NO. :

DRILLHOLE SUMMARY

Map Drilling Location Number	Company Name	Company Drillhole Number	Date Drilled	Bearing Azimuth	Initial Dip of Hole	Thickness of Overburden *	Total Length of Hole	Mineralization Noted in Log	Assay Data Included for
1	Kennco Explorations (Canada) Ltd.	M-16	7/65	137°	-55°	275'	1175'	py,qcv	Au
2	" "	15-A	7/65	30°	-55°	280'	280'	-	-
3	" "	M-15	6/65	30°	-55°	190'	190'	-	-
4	" "	M-14	2/65	0°	-55°	238'	238'	-	-
5	" "	M-13	1/65	0°	-55°	335'	810'	hem,qcv,py	Au
6	Ryan, W.J. (Yellow Sands Prospecting Syndicate)	85-1†	7/85	185°	-45°	248'	602'	py,po,qcv,gf	

GDIF FORM NO

† - Core stored at Swastika Drill Core Storage Library

* - Length of overburden down drill hole

AIRBORNE GEOPHYSICAL SURVEY DATA

No.	By For	Type of Survey	Flight Altitude	Flight Line Direction	Flight Line Spacing
5	Canadian Aero Mineral Surveys Ltd.	Magnetic	150 ft.	N-S	700 ft.
	Kennco Exploration (Canada) Ltd.	Electromagnetic			
6	Dighem Surveys & Processing Inc.	Magnetic	115 ft. (35m)	NE-SW	492 ft. (150m)
	Kerr Addison Mines Ltd.	Electromagnetic Resistivity			
9	Canadian Aero Mineral Surveys Ltd.	Magnetic	150 ft.	NE-SW	1/8 ml.
	Union Carbide Explorations Ltd.	Electromagnetic			
11	Canadian Aero Mineral Surveys	Magnetic	150 ft.	N-S	1/8 ml.
	Wright, H.H.	Electromagnetic			

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GEOCHEMICAL SURVEY DATA

Map Sample Site Reference Number	Type of Survey	Analysis For	By	Reference
2	Soil sampling	Au	Bay Ressources et Services Inc.	Kirkland Lake, Resident Geologist Assessment Files
5	Soil sampling Gravel sampling	Hg, Au	McPhar Geophysics Ltd. Kennco Exploration (Canada) Ltd.	Kirkland Lake, Resident Geologist Assessment Files
10	Gravel sampling	Au	Utex Gold	Kirkland Lake, Resident Geologist Assessment Files
11	Gravel sampling	Au	W.G. Wahl Ltd.	Kirkland Lake, Resident Geologist Assessment Files
3	Quartz boulders	Au	Denison Mines Ltd.	Kirkland Lake Resident Geologist Assessment Files

GDIF FORM NO.

MISCELLANEOUS DATA

AGE DATING

Site	Method	Material	Reference	Result

Aerial Photographs

Black and White scale 1:1/4 mile
scale 1:1 mile

Landsat Data scale 1:500,000

Band 3 , 9/5/83
Band 4 , 31/2/83
Bands 1+2+4 , 2/10/83
Bands 1+2+4 , 9/5/83

NEWSPAPER CLIPPINGS FILE

NOTE: A file of newspaper clippings about the companies listed below, who have worked in this area, is maintained in the Regional/Resident Geologist's Office. Kirkland Lake

Bay Resources

The Northern Miner	Feb 28, 1985
	Apr 11, 1985

Flagro

The Northern Miner	Jun 19, 1952

ODM GENERAL INDEX SEARCH

Words searched:
Milligan Township

Index Volume	Listing:	Report Volume	Part	Page
2	Milligan Tp., Coch. Forest Fires	28	2	6
9	Milligan Tp., Coch. gold float	MDC 017		65
	Gravity Survey, Timmins-Matheson area	GR 135		
	Placer Gold	MDC 017		165

GDIS FORM NO. 9

ODM GENERAL INDEX SEARCH

Words searched:

Index Volume	Listing:	Report Volume	Part	Page

GDIF FORM NO. 8

MILLIGAN TOWNSHIP

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
		REGIONAL GEOLOGICAL COMPILATION MAPS		
Ayers, L.D. Lumbers, S.B. Milne, V.G. Robeson, D.W.	1970	Ontario Geological Map	ODMNA Map 2196	1:1 013 760
Ayers, L.D. Lumbers, S.B. Milne, V.G. Robeson, D.W.	1971	Ontario Geological Map, East Central Sheet	ODMNA Map 2198	1:1 013 760
Boissoneau, A.N.	1965	Algoma-Cochrane Surficial Geology, Ontario	ODL & F Map S365	1:506 880
Boissoneau, A.N.	1965	Algoma, Sudbury, Timiskaming and Nipissing Surficial Geology	ODL & F Map S465	1:506 880
Card, K.D. Sanford, B.V.	1983	Geology of the Timmins Map Sheet (NM-17)	GSC OF 956	1:1 000 000
Easton, R.M.	1986	Geochronology Compilation Map for Ontario: Sheet 3: East-Central Ontario, All Isotopic Systems	OGS Map P.2842	1:1 013 760
Ginn, R.M.	1964	Timmins-Kirkland Lake Sheet, Cochrane, Sudbury and Timiskaming Dists., Ont. Geol. Compilation Series	ODM Map 2046	1:253 440
Ginn, R.M. Fenwick, K.F.	1962	Iroquois Falls-Lake Abitibi Sheet, District of Cochrane	ODM Map P.140	1:126 720
Gordon, J.B.	1977	Gold Deposits of Ontario, East Central Sheet	OGS Map P.1228	1:1 013 760
Gordon, J.B.	1980	Vein Silver Deposits of Ontario, East Central Sheet	OGS Map P.2300	1:1 013 760

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Guillet, G.R.	1977	Clay and Shale Deposits of Ontario	OGS Map 2358 (MDC 15)	1:200 000
Jost, M.	1977	Nickel Deposits of Ontario, East Central Sheet	OGS Map P.1062	1:1 013 760
Lumbers, S.B. Milne, V.G.	1979	Ontario Geological Map, Explanatory Text, Legend and Diagrams of Major Lithologies, Structures and Zones of Metamorphism	OGS Map 2391	1:1 013 760
Lumbers, S.B. Milne, V.G.	1979	Ontario Geological Map, East Central Sheet	OGS Map 2393	1:1 013 760
McCrank, G.F. Brown, P.A. Misiura, J.D.	1980	Plutonic Rocks in Ontario, with map.	GSC OFR 706	
MERQ-OGS	1984	Lithostratigraphic Map of the Abitibi Subprovince	OGS Map 2484 Que Map DV83-16	1:500 000
Meyn, H.D. Howarth, J.R.	1977	Molybdenum Deposits of Ontario, East Central Sheet	OGS Map P.1246	1:1 013 760
Meyn, H.D. Robertson, J.A.	1975	Iron Deposits of Ontario, East Central Sheet, Districts of Thunder Bay, Algoma, Cochrane, Sudbury, Timiskaming and Nipissing	ODM Map P.1043	1:1 013 760
Ministry of Natural Resources	1985	Ontario Mineral Map	ODM Map 2472	1:1 584 000
Minnes, D.G. Masham, J.S. Scott, D.W. Vos, M.A. & Yundt, S.E.	1983	Industrial Minerals of Ontario	OGS Map P.2591	1:1 500 000
ODM	1969	Mining Divisions and Resident Geologists Districts	ODM Map 2189	1:1 584 000

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
ODM	1974	Ontario Mineral Map	ODM Map 2310	1:1 584 000
ODM	1977	Ontario Geology and Principal Minerals	ODM Map 2389 (Rev.)	1:4 224 000
ODMNA	1971	Ontario Geology and Principal Mineral Collecting Localities, Discover Ontario	ODMNA Map 2211	1:4 224 000
OGS	1986	Geological Highway Map, Northern Ontario	OGS Map 2506	1:1 600 000
Pyke, D.R., Ayres,L.D. Innes, D.G.	1973	Timmins - Kirkland Lake, Geological Compilation Series, Cochrane, Sudbury and Timiskaming Districts	ODM Map 2205	1:253 440
Robertson, J.A.	1976	Mineral Potential Map of Ontario, East Central Sheet	ODM Map P.1099	1:1 013 760
Robertson, J.A.	1982	Uranium and Thorium Deposits of Ontario, East Central Sheet, NTS 31/NW, 32/W, 41/N, 42	OGS Map P.2426	1:1 013 760
Springer, J.	1977	Ontario Mineral Potential, Timmins Sheet and Part of Noranda-Rouyn Sheet, Districts of Sudbury, Timiskaming and Cochrane	OGS Map P.1517	1:250 000
		GEOPHYSICAL MAPS		
Data Plotting Services Inc.	1984	Matheson-Black River Area (BRIM) Magnetic Survey Total Field, based on Airborne Electromagnetic and Total Intensity Magnetic Survey, Matheson-Black River Area, by Questor Surveys Ltd. for the OGS. (1984)	MNDM Resident Geologist's Office, Kirkland Lake, Ontario	1:80 000
Data Plotting Services Inc.	1985	Matheson-Black River Area (BRIM) Airborne Magnetic Survey Second Vertical Derivative based on Airborne Electromagnetic and Total Intensity Magnetic Survey, Matheson-Black River Area, by Questor Surveys Ltd. for the OGS. (1984)	MNDM Resident Geologist's Office, Kirkland Lake, Ontario	1:100 000

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Dighem Surveys and Processing Inc.	1986	"Enhanced Shadow" Magnetics, Black River-Matheson Area (BRIM) based on Airborne Electromagnetic and Total Intensity Magnetic Survey, Matheson-Black River Area, by Questor Surveys Ltd. for the OGS. (1984)	MNDM Resident Geologist's Office, Kirkland Lake, Ontario	1:100 000
GSC	1970	Matheson, Cochrane District, Aeromagnetic Series	GSC Map 296G (Rev.)	1:63 360
GSC	1970	Timmins, Cochrane, Timiskaming and Sudbury Districts, Total Field Contour Map	GSC Map 7085G	1:250 000
GSC	1970	Matheson, Cochrane District, Ontario Aeromagnetic Series	GSC Map 8431G	1:31 680
GSC	1975	Matheson East, NTS 42A/9a (High Resolution Aeromagnetic)	GSC Map 20 147	1:25 000
GSC	1975	Matheson East, NTS 42A/9h (High Resolution Aeromagnetic)	GSC Map 20 148	1:25 000
GSC	1975	Matheson East, NTS 42A/9g, (High Resolution Aeromagnetic)	GSC Map 20 154	1:25 000
ODMNA	1974	Aeromagnetic Index of Ontario	ODMNA Map 2229	1:1 900 800
OGS	1984	Airborne Electromagnetic and Total Intensity Magnetic Survey, Matheson-Black River Area, Milligan Township	OGS Map 80 577	1:20 000 1:31 680
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric Total Count, Timmins, NTS 42A	OGS Map 80 280 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric Potassium (Percent), Timmins, NTS 42A	OGS Map 80 281 GSC Map 35142G	1:250 000

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric Uranium (eU), Timmins, NTS 42A	OGS Map 80 282 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric Thorium (eTh), Timmins, NTS 42A	OGS Map 80 283 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric eU/Th Ratio, Timmins, NTS 42A	OGS Map 80 284 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric eU/K Ratio, Timmins, NTS 42A	OGS Map 80 285 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airbrone Gamma-Ray Spectrometric eTh/K Ratio, Timmins, NTS 42A	OGS Map 80 286 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric Profiles of Integral U, Th, K, U/Th, U/K, Th/K, for line 62 (1), Timmins, NTS 42A	OGS Map 80 317 GSC Map 35142G	1:250 000
OGS-GSC	1979	Airborne Gamma-Ray Spectrometric Profiles of Integral U, Th, K, U/Th, U/K, Th/K, for line 63 (1), Timmins, NTS 42A	OGS Map 80 318 GSC Map 35142G	1:250 000
		GEOLOGICAL MAPS AND REPORTS		
Baker, C.L.	1985	Overburden Stratigraphy of the Matheson Area: Advancing Thoughts on Ice Fronts (Abstract)	OGS Geo.Sci. Seminar & Open House '85	p.9
Baker, C.L. McClenaghan, M.B. Steele, K.G.	1985	Reconnaissance Heavy Mineral and Geochemical Sampling of the Munro Esker, Lake Abitibi Area, Cochrane District	OGS MP 126	p.297-300

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Baker, C.L. Steele, K.G.	1984	Sonic Drilling-Exploration Basics in the Matheson Area (Abstract)	OGS Geo. Sci. Seminar & Open House '85	p.23
Baker, C.L. Steele, K.G. McClenaghan, M.B.	1985	Reconnaissance Till Sampling Program, Matheson-Lake Abitibi Area, Cochrane District	OGS MP 126	p.329-333
Baker, C.L. Steele, K.G. McClenaghan, M.B.	1986	Gold Grains in Sonic Drill Core Samples (1985) from the Lake Abitibi-Matheson Area, District of Cochrane	OGS Map P.2958	1:100 000
Barlow, R.B. Pitcher, D.H.	1984	An Airborne Electromagnetic-Magnetic Survey of the Black River-Matheson (BRIM) Area, District of Cochrane	OGS MP 119	p.287-289
Bath, A.C.	1985	Black River-Matheson Economic Geologist Program	OGS MP 126	p.301-311
Bath, A.C.	1985	Black River-Matheson Economic Geologist Program (Abstract)	OGS Geo. Sci. Seminar & Open House '85	p.8
Bath, A.C.	1986	Black River-Matheson Economic Geologist Program	OGS MP 132	p.421-430
Ferguson, S.A. Freeman, E.B.	1978	Ontario Occurrences of Float, Placer Gold and Other Heavy Minerals	OGS Min. Dep. Circ. No. 17	214p.
Fortescue, J.A.C.	1984	Summary of Activities 1984, BRIM Program	OGS MP 119	p.274-277
Ginn, R.M. Leahy, E.J.	1961	Milligan Township, District of Cochrane	ODM Map P.104	1:15 840
GSC	1981	Magnetic Anomaly Map, Timiskaming-Kapuskasing Region	GSC Map 153A	1:1 000 000
Guillet, R.	1969	Ontario Marl Deposits	ODM Map 2183	1:1 013 760

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Guindon, D.L. Nichol, I.	1983	Ontario Geoscience Research Grant Program, Grant No. 76 - Speciation of Free Gold in Glacial Overburden	OGS OFR 5444	15p.
Hewitt, D.F. Satterly, J.	1953	Asbestos in Ontario	ODM Indust. Min. Circ. No. 1	
Hewitt, D.F. Vos, M.A.	1972	Ontario Limestone Quarries, 1971	ODM Map 2264 (Rev.)	1:1 013 760
Hodgson, C.J.	1983	Preliminary Report on the Timmins-Kirkland Lake Area Gold Deposits File	OGS OFR 5467	434p.
Hopkins, P.E.	1918	Notes on Lake Abitibi Area, Cochrane District	OBM AR 27, pt.1	p.200-214
Hughes, O.L.	1959	Surficial Geology of Iroquois Falls, Cochrane District, Ontario	GSC Map 46-1959	1:126 720
Hurst, M.E.	1943	Abitibi-Timiskaming Area, Districts of Cochrane and Timiskaming	ODM Map 1934A	1:126 720
Jensen, L.S.	1985	Geological Overview of the BRIM Area (Abstract)	OGS Geo. Sci. Seminar & Open House '85	p.6
Jensen, L.S. Baker, C.L.	1986	Preliminary Results of Bedrock Samples from the Sonic Drilling Program (1985) in the Lake Abitibi-Matheson Area	OGS Map P.2986	1:100 000
Jensen, L.S. Langford, F.F.	1983	Geology and Petrogenesis of the Archean Abitibi Belt in the Kirkland Lake Area, Ontario	OGS OFR 5455	520p.
Jensen, L.S. Langford, F.F.	1985	Geology and Petrogenesis of the Archean Abitibi Belt in the Kirkland Lake Area, Ontario	OGS MP 123	130p.

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Johnstone, R.	1986	Precambrian Geology of the Black River-Matheson Area, Cochrane District	OGS OFM 50	
Johnstone, R.	1986	Precambrian Geology of Coulson, Warden, and Milligan Townships, Black River-Matheson (BRIM) Area, Cochrane District	OGS MP 132	p.392-397
Knight, C.W. Burrows, A.G. Hopkins, P.E. Parons, A.L.	1919	Gold Area Between Lakes Abitibi and Night Hawk, Timiskaming District	OBM Map 28B AR 28, pt.2	1:126 720 p.1-70
Lee, H.A.	1979	Northern Ontario Engineering Geology Terrain Study, Data Base Map, Iroquois Falls	OGS Map 5027	1:100 000
Lovell, H.L. Frey, E.D.	1972	Milligan Township, District of Cochrane	ODM Map P.772	1:15 840
Lovell, H.L. Grabowski, G. Guindon, D.L.	1983	1982 Report of the Kirkland Lake Resident Geologist	OGS MP 107	p.107-129
Lovell, H.L. Grabowski, G. Guindon, D. Bath, A.C.	1986	Kirkland Lake Resident Geologist Area, Northern Region	OGS MP 128	p.179-212
Malczak, J.	1985	Industrial Mineral Potential of the Black River-Matheson (BRIM) Area, District of Cochrane	OGS MP 126	p.326-328
Malczak, J.	1985	Overview of the Industrial Mineral Potential of the Black River-Matheson (BRIM) Area (Abstract)	OGS Geo. Sci. Seminar & Open House '85	p.9

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
McClenaghan, M.B.	1985	Backhoe Sampling and Analytical Procedures: Fingerprinting the Drift (Abstract)	OGS Geo. Sci. Seminar & Open House '85	p.10
Middleton, R.S.	1976	Gravity Survey of Geological Structures in the Timmins and Matheson Area, NTS 42A, Cochrane, Sudbury and Timiskaming Districts	ODM GR 135 Maps 2321 2322	
OGS	1984	Ontario Mineral Deposit Inventory	OGS OFR 5470	
OGS	1986	Sonic Drillhole 85-12, Milligan Township	OGS Map 80 855	
OGS	1986	Sonic Drillhole 85-13, Milligan Township	OGS Map 80 856	
OGS	1986	Sonic Drillhole 85-14, Milligan Township	OGS Map 80 857	
Pitcher, D.H.	1985	A Correlation of Airborne and Ground Electromagnetics With Sonic Drilling Results in the Black River-Matheson Area	OGS MP 126	p.334-340
Pitcher, D.H. Barlow, R.B. McNeill, J.D.	1984	Mapping the Overburden in Black River-Matheson (BRIM) Area, District of Cochrane, employing an airborne time-domain system	OGS MP 119	p.299-307
Sado, E.V.	1985	Summary of Activities 1985, Operation Black River-Matheson (BRIM)	OGS MP 126	p.287-290
Sado, E.V.	1985	Introduction to the Black River-Matheson Program (BRIM) (Abstract)	OGS Geo. Sci. Seminar & Open House '85	p.5
Sado, E.V.	1986	Summary of Activities 1986, Operation Black River-Matheson (BRIM)	OGS MP 132	

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Satterly, J.	1958	Geological Map of the Province of Ontario	ODM Map 1958B	1:1 267 200
Satterly, J.	1968	Aeromagnetic Maps of Carbonatite-Alkalic Complexes in Ontario	ODM Map P.452	1:4 224 000
Steele, K.G.	1985	Sonic Drilling- Rigs, Rods and Reasons (Abstract)	OGS Geo. Sci. Seminar & Open House '85	
Steele, K.G. Baker, C.L. McClenaghan, M.B.	1986	Reconnaissance Till Sampling Program, Matheson-Lake Abitibi Area, District of Cochrane	OGS MP 132	p.398-403
Steele, K.G. McClenaghan, M.B. Baker, C.L.	1986	Gold Grains in Backhoe Till Samples (1984-85) from the Matheson-Lake Abitibi Area, District of Cochrane	OGS Map P.2983	1:100 000
Strangway, D.W. Geissman, J.W. Bambrick, J. Letros, S. et al.	1981	Magnetism and Stratigraphy in Volcanic and Sedimentary Rocks of the Abitibi Belt	OGS MP 98	p.251-266
Vagners, U.J.	1984	Quaternary Geology of the Matheson Area, District of Cochrane	OGS Map P.2735	1:50 000
Whittaker, P.J.	1985	Regional Metallogenesis of the BRIM Area, District of Cochrane (Abstract)	OGS Geo. Sci. Seminar & Open House '85	
Whittaker, P.J.	1986	Metallogenic Studies in the Black River-Matheson Area, Cochrane District	OS OFM 65	
Whittaker, P.J. Malczak, J.	1984	Mineral Deposits Investigation in the Black River-Matheson (BRIM) Area, District of Cochrane	OGS MP 119	p.290-294

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
		JOURNAL ARTICLES, THESES AND TECHNICAL REPORTS		
Agterberg, F.P. Chung, C.F. Fabbri, A.G. Kelly, A.M.	1972	Geomathematical Evaluation of Copper and Zinc Potential of the Abitibi Area, Ontario and Quebec	GSC Paper 71-41	55p.
Canada Department of Agriculture	1978	Soils of Timmins-Noranda-Rouyn Area, Ontario, NTS 42A-32D	Can. Dept. of Agri. Soil Surv. Rept. No. 46	
Goodwin, A.M.	1980	Archean Volcanic Studies in the Timmins-Kirkland Lake-Noranda Region of Ontario and Quebec	GSC Bull. 278 Map 1461A	51p. 1:250 000
Goodwin, A.M.	1980	Geology of Timmins-Kirkland Lake, Ontario-Quebec	OGS Map 1461A acc. Bull. 278	
Guindon, D.L.	1982	The Geochemistry of Free Gold and Its Application in Exploration	Unpub. MSc Thesis Queen's U	
Hughes, O.L.	1959	Surficial Geology of Smooth Rock and Iroquois Falls Map Areas, Cochrane District, Ontario	Unpub. PhD Thesis U of Kansas	
Jensen, L.S.	1985	Stratigraphy and Petrogenesis of Archean Metavolcanic Sequences, Southwestern Abitibi Subprovince, Ontario	GAC Spec. Paper No. 28	p.65-88
Kutina, J. Fabbri, A.	1972	Relation of Structural Lineaments and Mineral Occurrences in the Abitibi Area	GSC Paper 71-9	
Lee, H.A.	1965	Investigation of Eskers for Mineral Exploration	GSC Paper 65-14	20p.

SELECTED REFERENCES

Author	Date	Title	Reference	Map Scales and/or Report Pages
Lee, H.A.	1968	An Ontario Kimberlite Occurrence Discovered by Application of the Glaciofocus Method to a Study of the Munro Esker	GSC Paper 68-7	3p.
Middleton, R.S.	1975	Gravity Control Network in the Timmins, Matheson and Cobalt Area, Cochrane and Timiskaming Districts, Ontario	ODM GR 127	
Whiteway, P.	1986	Barker-Holloway	Northern Miner Magazine v.1 no. 2	p.61-65

ONTARIO GEOLOGICAL SURVEY

PROPERTY LOCATION MAP

GEOLOGICAL DATA INVENTORY FOLIO 370

(Map 1 of 2)

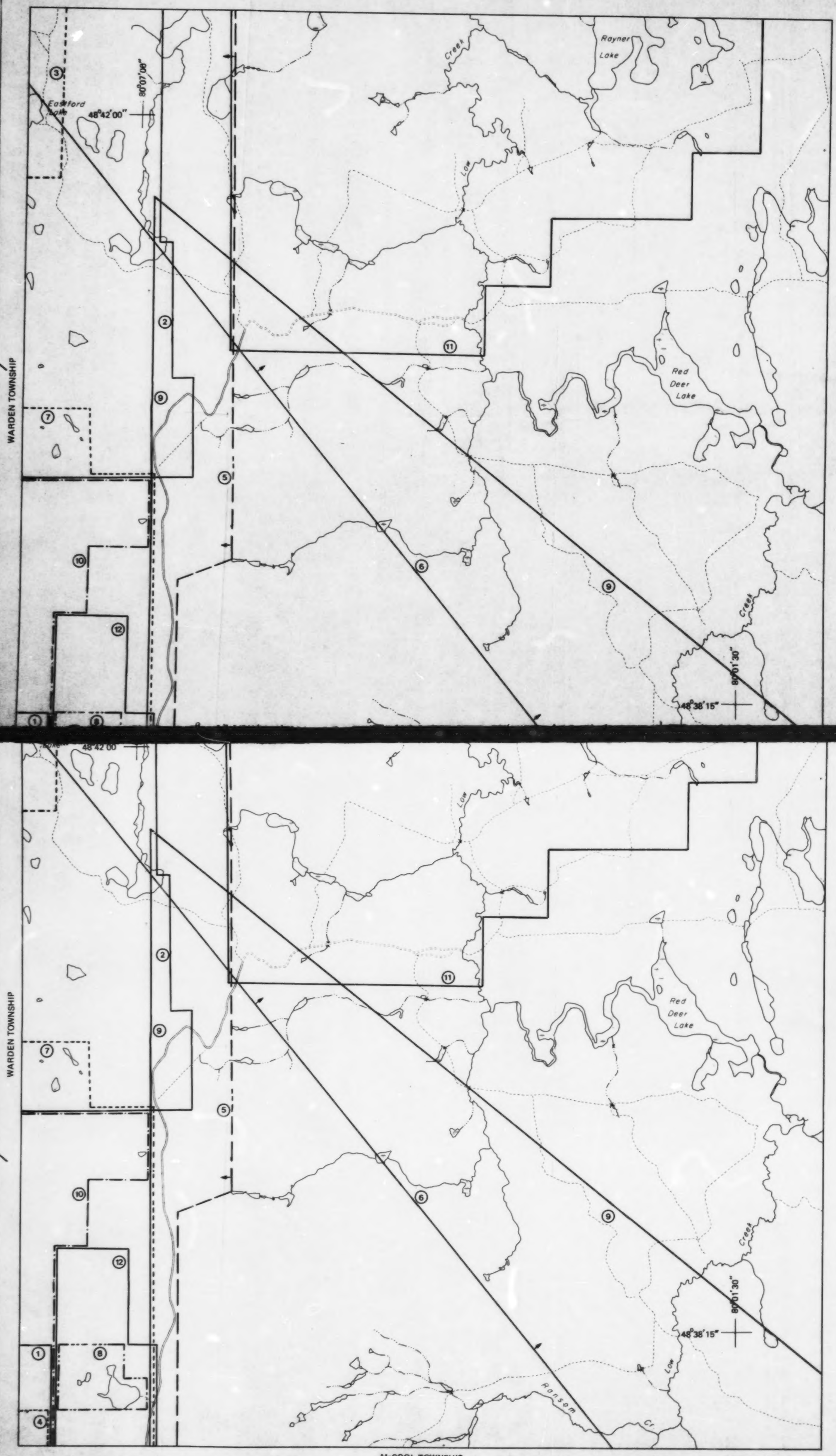
MILLIGAN TOWNSHIP

DISTRICT OF COCHRANE

Scale 1:31 680

Kilometre 0.5 0 0.5 1 Kilometre

Mile 0.5 0 0.5 1 Mile



EXPLORATION DATA FILE AREAS

Reference number is always inside work area outlined. See listing in text pages.

Small area exploration.

TYPES OF DATA SHOWN ON THIS MAP

GEOCHEMICAL AND GEOCHRONOLOGICAL DATA

- Geochemical sample site, with reference number
- Area of geochemical sampling, with reference number
- Age dating material sampling site, with reference number
- Geochemical sample site delineating trend of anomaly, with reference no.

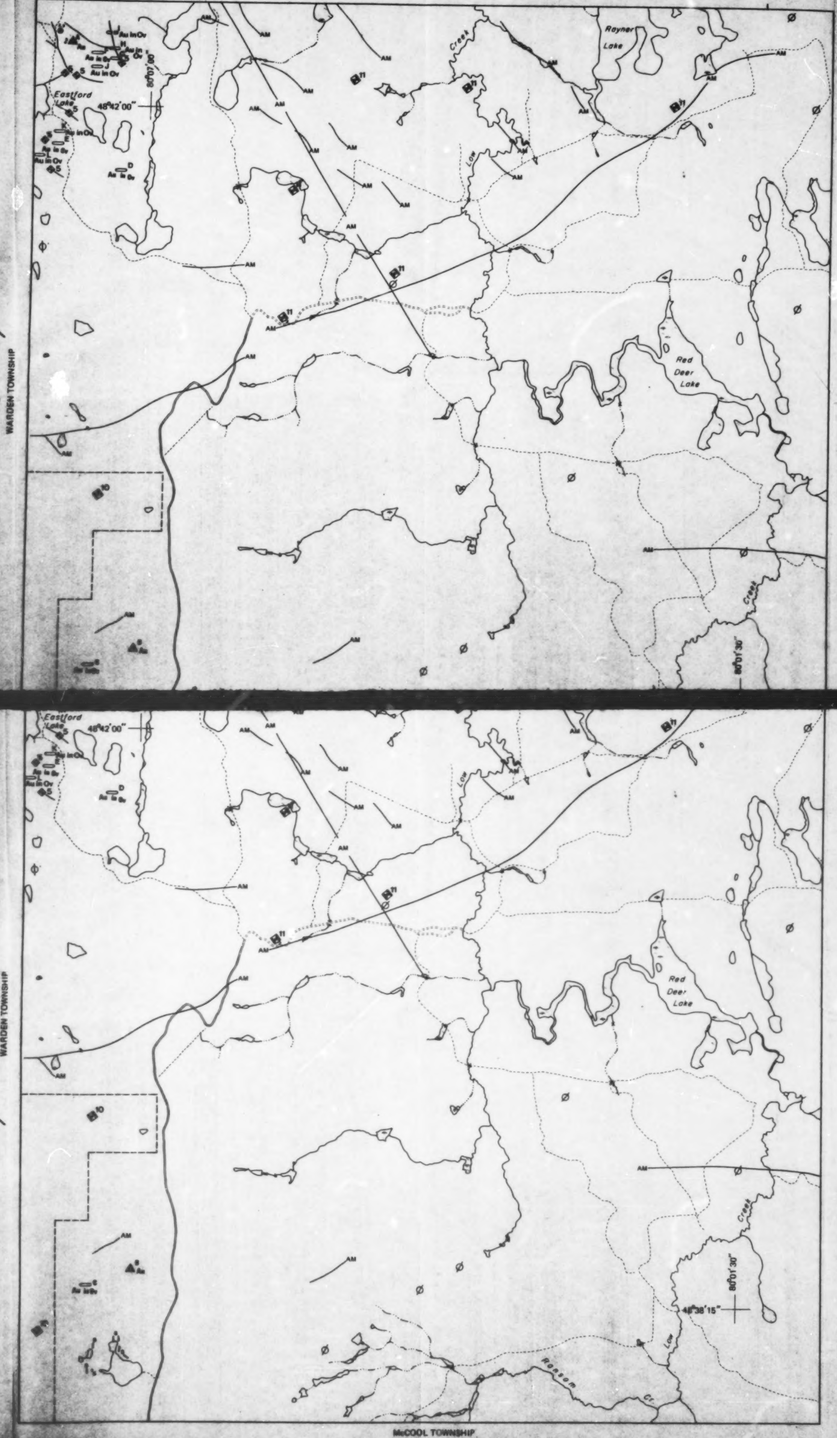
GEOPHYSICAL ANOMALIES

- AM — Airborne magnetic anomaly
- Airborne electromagnetic anomaly Length of anomaly along flight line
- Airborne electromagnetic anomaly Location of anomaly along flight line
- Airborne electromagnetic anomaly Conductor axis: definite, probable, possible
- ARA — Airborne radiometric anomaly
- M — Ground magnetic anomaly
- VL — Ground electromagnetic anomaly (VL - Vertical loop; HL - Horizontal loop; VLF - Very low freq; Turam; JEM - Crone Em - 16)
- RA — Ground radiometric anomaly
- IP — Induced polarization anomaly
- SP — Self potential anomaly
- AMAG — Audio-frequency magnetic anomaly (total intensity)
- R — Resistivity anomaly
- GR — Gravity anomaly

MISCELLANEOUS DATA

- Trenching, pit property no.
- Adit
- Open pit
- Rock quarry
- Sand and/or gravel pit

NOTE: Consult the text that accompanies this map for pertinent lists of data, references, and abbreviations.



Ministry of Northern Development and Mines

Ontario

ONTARIO GEOLOGICAL SURVEY

EXPLORATION DATA MAP

GEOLOGICAL DATA INVENTORY FOLIO 370

(Map 2 of 2)

MILLIGAN TOWNSHIP

DISTRICT OF COCHRANE

Scale 1:31 680

Kilometre 0.5 0 0.5 1 Kilometre

Mile 0.5 0 0.5 1 Mile

GEOLOGICAL AND MINING SYMBOLS

TYPES OF DATA SHOWN ON THIS MAP

MINERAL OCCURRENCES

- Mineral occurrence at surface, with reference letter
- Mineral occurrence with shaft, depth given with reference letter
- Mineral occurrence reported but exact location uncertain, with reference letter
- Mineralized float with reference letter
- Mineralized placer with reference letter.

DRILLHOLE

- Location of single drillhole, with reference number
- Location of closely spaced group of drillholes, with reference number
- Drillhole, exact location uncertain, with reference number
- Property with underground drillholes at one general area, with reference number
- Property with drillholes which have not been accurately located, with reference number
- Reverse circulation drillhole; churn drilling, with reference number